

CLAIMS

1. A method to induce stem cell differentiation in cardiomyocytes, wherein the cells are exposed for a period of time and in effective amounts to a protein of the EGF-CFC family or its derivatives, which comprises at least the EGF and CFC domains.
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2. A method according to Claim 1 in which the EGF and CFC domains derive from the sequence of the Cripto protein.
3. A method according to Claim 2 in which the EGF and CFC domains derive from the sequence of human Cripto protein.
- 10 4. A method according to Claim 2 in which the EGF and CFC domains derive from the sequence of mouse Cripto protein.
5. A method according to one of the preceding claims in which cell exposure occurs through genetic expression in stem cells via a suitable vector.
- 15 6. Stem cells induced to differentiate into cardiomyocytes obtainable according to the method of one of previous claims.
7. A composition for the treatment of heart diseases that comprises stem cells treated according to Claim 6.
8. The use of the stem cells according to Claim 6 for the treatment of heart diseases.
- 20 9. A composition for therapeutic use for treating heart disorders that comprises a therapeutically effective amount of a protein or its derivative, having at least the EGF and CFC domains of a protein of the EGF-CFC family.
10. A composition according to Claim 9 in which the protein has at least the EGF and CFC domains of the Cripto protein.
- 25 11. A composition according to Claim 9 in which the EGF and CFC domains derive from the human Cripto protein sequence.
12. A composition according to Claim 9 in which the EGF and CFC domains derive from the mouse Cripto protein sequence.
- 30 13. A method to induce stem cell differentiation into neuronal cells, wherein the cells are exposed for a period of time and in effective amounts to an inhibitor of the Cripto protein or the engineering of the cells in such a manner that they do not express endogenous functioning Cripto.

14. A method according to Claim 13 in which exposure to a Cripto inhibitor occurs in the early phases of stem cell differentiation.
15. A method according to Claim 13 in which the Cripto protein inhibitor is an anti-Cripto antibody or functional fragments thereof.
- 5 16. A method according to Claim 13 in which the Cripto protein inhibitor is a peptide specifically selected from a random combinatorial peptide library.
17. A method according to Claim 13 in which the Cripto protein inhibitor is an antagonist of the Alq4(receptor)-Cripto(co-receptor)-Nodal(ligand) pathway.
18. A method according to Claim 17 in which the antagonist is the peptide Cerberus
10 or its functional derivatives.
19. Stem cells induced to differentiate into neuronal cell lineages obtained according to one of the claims from 13 to 18.
20. A composition for the treatment of neuropathologies that comprises the stem cells according to Claim 19.
- 15 21. The use of the stem cells according to Claim 19 for treating neuropathologies.
22. The use of the Cripto protein or its inhibitors in the preparation of a composition able to direct stem cell differentiation toward the neuronal lineage.